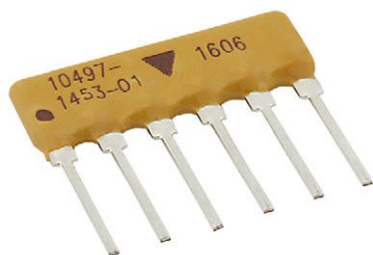


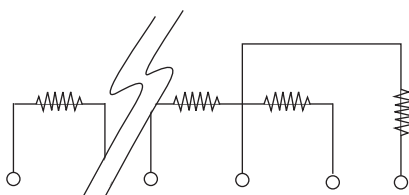
## Conformal, Single In-Line Thin Film Resistor, Through Hole Network (Custom)



Wirewound or metal film performance in a space saving package.

SIP networks available in 3 pins to 10 pins sizes can obtain important performance parameters in an economical, mass producible style. SIPs take up the least amount of board space and are the easiest possible configuration to hand-insert into printed circuit boards. Standard pin centers are 0.100". Passivation coatings plus a conformal coating of epoxy protect the active element from the outside environment.

### SCHEMATIC



Custom schematics available.  
Please consult factory.

### FEATURES

- Minimal PC board space
- Standard 100 mil centers
- Exceptional ratio stability over time and temperature ( $\Delta R \pm 0.015\%$  at  $+70^\circ\text{C}$  at 2000 h)
- Integrated construction
- Conformal coating flame resistant (UL 94 V-0 rating)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available

### Note

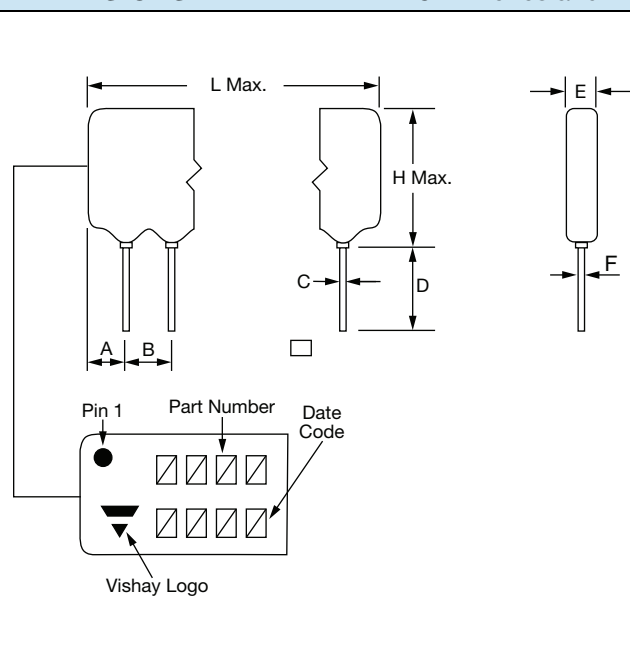
\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details.

### TYPICAL PERFORMANCE

	ABSOLUTE	TRACKING
TCR	10	2
	ABSOLUTE	RATIO
TOL.	0.05	0.02

STANDARD ELECTRICAL SPECIFICATIONS		
TEST	SPECIFICATIONS	CONDITIONS
Material	Passivated nichrome	-
Pin/Lead Number	3 to 10	-
Resistance Range	100 $\Omega$ to 2 M $\Omega$ total	-
TCR: Absolute	$\pm 10$ ppm/ $^\circ\text{C}$ to $\pm 25$ ppm/ $^\circ\text{C}$	$-55^\circ\text{C}$ to $+125^\circ\text{C}$
TCR: Tracking	$\pm 2$ ppm/ $^\circ\text{C}$ to $\pm 5$ ppm/ $^\circ\text{C}$	$-55^\circ\text{C}$ to $+125^\circ\text{C}$
Tolerance: Absolute	$\pm 0.05\%$ to $\pm 1.0\%$	$+25^\circ\text{C}$
Tolerance: Ratio	$\pm 0.01\%$ to $\pm 0.5\%$	$+25^\circ\text{C}$
Power Rating: Resistor	0.100 W (per element)	Maximum at $+70^\circ\text{C}$
Power Rating: Package	-	Maximum at $+70^\circ\text{C}$
Stability: Absolute	$\Delta R \pm 0.05\%$	2000 h at $+70^\circ\text{C}$
Stability: Ratio	$\Delta R \pm 0.015\%$	2000 h at $+70^\circ\text{C}$
Voltage Coefficient	$< 0.1$ ppm/V	-
Working Voltage	100 V	-
Operating Temperature Range	$-55^\circ\text{C}$ to $+125^\circ\text{C}$	-
Storage Temperature Range	$-55^\circ\text{C}$ to $+125^\circ\text{C}$	-
Noise	$< -30$ dB	-
Thermal EMF	$< 0.10$ $\mu\text{V}/^\circ\text{C}$	-
Shelf Life Stability: Absolute	$\Delta R \pm 0.01\%$	1 year at $+25^\circ\text{C}$
Shelf Life Stability: Ratio	$\Delta R \pm 0.002\%$	1 year at $+25^\circ\text{C}$

**DIMENSIONS AND IMPRINTING** in inches and millimeters

	DIMENSION	INCHES	MILLIMETERS
	A	0.058 typ.	1.47 typ.
	B	0.100 typ.	2.54 typ.
	C	0.020 ± 0.003	0.51 ± 0.08
	D	0.125 min.	3.18 min.
	E	0.110 max.	2.79 max.
	F	0.010 typ.	0.25 typ.
	L (3 Pins)	0.320	8.13
	L (4 Pins)	0.420	10.67
	L (5 Pins)	0.520	13.21
	L (6 Pins)	0.620	15.75
	L (7 Pins)	0.720	18.29
	L (8 Pins)	0.820	20.83
	L (9 Pins)	0.920	23.37
	L (10 Pins)	1.020	25.91
	H (3 Pins)	0.280 <sup>(1)</sup>	7 <sup>(1)</sup>
	H (4 Pins)		
	H (5 Pins)		
	H (6 Pins)		
	H (7 Pins)		
	H (8 Pins)		
	H (9 Pins)		
	H (10 Pins)		

**Note**
<sup>(1)</sup> H dimension, R-value and schematic dependent

**MECHANICAL SPECIFICATIONS**

<b>Resistive Element</b>	Passivated nichrome
<b>Substrate Material</b>	Alumina
<b>Body</b>	Epoxy coated
<b>Terminals</b>	Copper alloy
<b>Tin/Lead Option</b>	Sn60 - Sn63
<b>Lead (Pb)-free Option</b>	Sn96.5, Ag3.0, Cu0.5
<b>Tin/Lead and Lead (Pb)-free Finish</b>	Hot solder dip

**ORDERING INFORMATION CHECK LIST (Customs)**

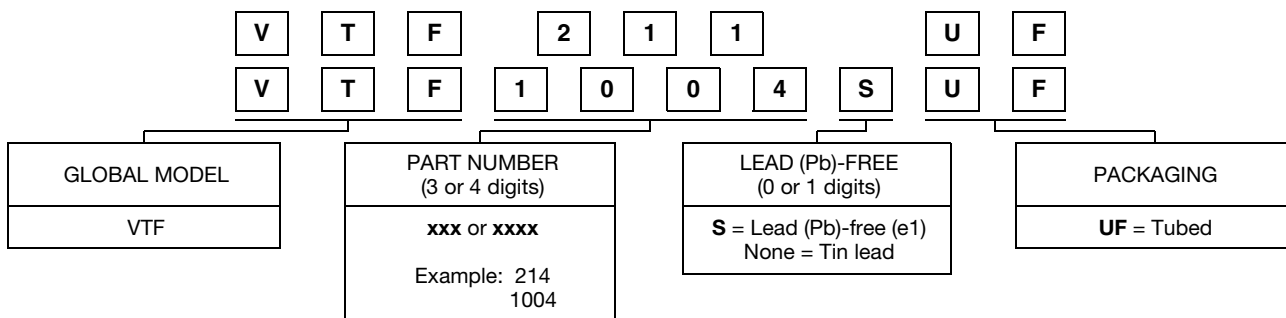
Special requirements should be identified in advance, but as a minimum, you should have the following information ready.

ELECTRICAL	MECHANICAL
1. Resistors, by value and tolerance 2. Reference resistor(s) and matching of which resistors to which reference resistors 3. Resistance by ratio 4. Absolute temperature coefficient of resistivity 5. Temperature tracking of subordinate resistors to reference resistor(s) 6. Maximum operating voltage 7. Resistor power ratings 8. Operating temperature range	1. Maximum allowable seated height (from PC board to top of network) 2. Special marking concerns 3. Schematic pin out of package 4. Specify if lead (Pb)-free
For additional assistance refer to Vishay Thin Film's guide to understanding Thin Film precision. Resistor networks or application engineering. All standard products may be ordered directly from Vishay Thin Film.	



## GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: VTF211UF



Historical Part Number example: VTF Custom 211 (for reference purposes only)





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.